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ABSTRACT

This study compares three methods of intervention conducted over 2 1/2 years to promote cognitive development and competency of disadvantaged young children. Subjects were about 80 black mother-child-younger sibling triads, divided into three groups (and matched with comparison groups): (1) Maximum Impact, a training program for the target child (3 to 4 years of age) at a center 5 days a week, and for the mother at a center once a week; (2) Curriculum, which gave the older children a classroom program like that of the first group but offered no program for mother or siblings; and (3) Home Visitor, in which the family had no direct contact with the center but received 1-hour home visits once a week from a teacher who showed the mother how to instruct her children. The center program for mothers taught them how to stimulate their children intellectually and improved mothers' self-concept and home management. The children's class program emphasized skill development and an ordered environment. Intelligence pretests and posttests were given to mothers and children. Program effects on target children, differential effect of the mothers' involvement, vertical diffusion to siblings, and the effect of the home visitor are discussed. (NH)

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Intervention with Mothers and Young Children: A Study of Intrafamily Effects

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ACKNOWLEDGMENTS

A study involving a large number of parents and children, and extending over several years, must inevitably be the work of many people.

We would like to acknowledge the major contributions of Janet Camp and June Miller who served as directors at different terms of the Early Training Center in which the children were involved; Della Horton who served as trainer for the mothers of the Maximum Impact groups; Beulah Hardge who served as trainer for the Home Visitor group; Susan Land and Carolyn Brown, Lead Teachers. To the small group teachers also our thanks are owed. Jane Bridgman, Social Worker, was invaluable throughout the conduct of the study.

But most of all, our thanks are owed to the children and parents with whom we worked. Their interest and involvement in the program has been a constant source of delight and gratitude to us.

Chapter I

Introduction

The study reported in this paper is concerned with comparing three methods and procedures of intervening with families from low-income environments to promote the cognitive development and competency of the young children in the home. In this work the mothers have been the focal point. This study is in part a systematic exploration of an unexpected finding in the Early Training Project (Klaus & Gray, 1968). The Early Training Project was an intervention study with disadvantaged children in which special summer school experiences were provided for the groups of children for either two or three summers prior to school entrance. The general objective of the program was to provide organized experiences which would enhance the child's chances of coping effectively with formal schooling. During the nine months intervening between the summer programs, weekly home contacts were planned to carry forward the objectives of the summer school and to prevent the loss which might be expected over the winter months when no group program was planned.

At the suggestion of the home visitor in one of the groups, we tested the younger siblings of the two experimental groups and of the local and distal groups. When compared with the younger siblings of the controlled groups, those of the experimental group with the longer treatment--three summers and two intervening winters--showed a significant 13 point IQ superiority over the control children. This post hoc finding seems most likely to have been the result of the intersession contact made by the home visiting teacher with the mothers of the experimental children.

The present study represents an attempt to explore more systematically the influence of working with the mother upon a performance of children involved in an assembled group program and upon the younger siblings of those children.

The specific experimental questions which are asked in the present study are as follows: (1) Is the spread of effect to the younger sibling (vertical diffusion) a reliable phenomenon? (2) Is the mother the crucial environmental agent? (3) Will early intervention in the system provide the sustaining conditions for continued growth and development of the child?

In our work with disadvantaged children and their families, we made the assumption that environmental inadequacy is the primary factor leading to progressive intellectual retardation and to the inability to cope effectively in an increasingly complex society. The cycle of defeat and failure is self-perpetuating, creating an evermore apparent gap between those caught in its grip and those reaping the benefits of an affluent society. Our choice point for intervention has been with the young child and with his mother.

In designing our intervention strategy, two major dimensions of the environment have received attention. One is the objective environment, or the world of things which the child manipulates. The objective environment provides stimulus input which must be processed, thus contributing materially to intellectual and motivational development. The objective environment provides feedback to the child as to the relevance of his attending and exploratory behavior; in turn it affects his ability to process information efficiently and to utilize it effectively. It provides reinforcement for his manipulative behaviors, and helps in the development of a concept of personal control over his world and himself.

The second dimension, perhaps even more important, is the instrumental environment, or the world of people. The instrumental environment consists of those significant others who mediate between the child and the objective environment by imposing temporal and spatial order upon it. The effective instrumental

agent in interacting with the child, provides behavior models and arranged appropriate reinforcement contingencies to encourage and sustain continued development and motivation. These considerations argue for an active, or participating, involvement with a child rather than a passive, or observing detachment, if one wishes for positive change.

The child, then, is seen as a part of an ecological system whose elements are in continuous interaction. This interchange can be stimulating and supportive, providing the conditions for continued growth and development of competency. If either of these major environmental dimensions is inadequate, however, the interaction will inhibit or restrict development. Only by attending to all the essential elements of the system, can we expect positive development to occur and be sustained.

During the child's early formative years, the instrumental environment is primarily the family and, more specifically, the effective instrumental agent is the mother. Our intervention strategy has been directed at the mother as well as the child. We have also recognized that our intrusion adds another factor in the basic ecological system.

A question that often arises in discussions of intervention research is that of values. In working with families from disadvantaged backgrounds, we have taken the stand that there is nothing quaint about poverty, nothing socially uplifting about hunger, nothing self-rewarding about hopelessness, nothing inspiring about ignorance, and nothing culturally valuable about despair. We have assumed that to have the freedom of choice one must have the skills to make decisions. If one is going to have the right opportunity, one must be prepared adequately to take advantage of it. To be socially competent, one must be able to compete effectively for the rewards society has to offer. One must also be

able to forge new roles which enhance oneself. Our intervention research then is value-oriented in the sense that it is based on the notion that social competency emanates from the development of adequate cognitive skills and the sustaining motivational states upon which self-development depends.

Chapter II

General Design and Procedure

The general design of the study included three groups, each receiving a different treatment or intervention program. Appropriate comparison groups were carefully chosen to match the demographic characteristics of the treatment families.

Subjects

The subjects from this study were approximately 80 mother-older child-younger child triads. These triads were selected from a large housing project which drew entirely from a black population. This particular housing project is one of the better ones in this city, and its inhabitants would be considered as only moderately disadvantaged. Table 1 gives some general demographic characteristics of the three intervention groups.

Although the housing project was a large one, containing approximately 640 units, it proved to be very difficult to constitute groups as desired. Our original plan was that the older child preferably should be the first or our second child in the family and that there should be a younger sibling present. It was also necessary that the so-called target-aged child, the older sibling with whom we were concerned, should be between the ages of three and four at the beginning of the intervention. A further restriction was the availability and willingness of the mother to spend one-half day a week working in the project. Because of these restrictions, there was some difficulty in constituting groups. These limitations will be mentioned as the groups are described.

The first group was designated the Maximum Impact Group, where both the mother and a target child of the family came to the center for a training program. The mother came to the center once a week; the child, five days a week. The mother's training program was a sequential process of skill development and movement from directed observations to actual classroom participation in a

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Table 1

Demographic Characteristics*

Treatment Groups	Mean Age		Educ. Attain.		Father Ab.	Public Assist.	No. of children	Target C's Ord Position			
	Mother	Father	Mother	Father				1st	2nd	3rd	4th
Maximum Impact	23	25	10	11	2	1	3.9	8	8	4	0
Curriculum	26	32	10	10	4	2	5.5	2	4	4	10
Home Visitor	28	29	10	9	10	7	5.4	3	4	2	11

*Of original N of 20 for each group

teaching role. At a later point in the program a home-visiting teacher called at the home to stimulate use of the mother's newly learned skills in the training program. Continual reinforcement was provided in small group meetings, where the mothers shared successes with their peers. The children's program was a comprehensive developmental curriculum to foster socialization for competence. It centered around the development of aptitudes of skills for environmental mastery, and around the development of sustaining attitudes necessary for continued growth.

In the second group, the target child of the family was the only member enrolled in a program. In this Curriculum group, the child was provided a classroom program which was a replication of that received by the Maximum Impact target child.

The third group was designated the Home Visitor group. Here the family had no direct contact with the Early Training Center but was visited in the home once a week by a home-visiting teacher who worked directly with the mother and used the child to demonstrate the techniques and procedures consistent with the classroom programs.

In the two groups in which the children were involved in the Early Training Center classroom groups, the children were between three and four years of age at the inception of the study. The triads in these two groups were randomized in so far as possible. Some non-random choices were necessary, however, because of differences in the availability of mothers. In the home visitor group the older of the two siblings in each home were one year in advance of the children in the classroom groups. The only restriction on the age of the younger siblings in any of the groups was that they should be of an age of at least 18 months at the inception of the study.

The constitution of the comparison groups was based on a selection of natural environment groups; children who were from the same housing situation, but

whose enrollment in a local year around preschool program provided immediate accessibility and continuing follow-on potential, were the first such group. This group was the Front Wave I group. A year later, a second similarly constituted group was selected and tested and was the Front Wave II group. A third group from the housing project setting was the Younger Sibling Comparison group. This group consisted of mother and child pairs who were comparable to the treatment families in the study. The children in this comparison group were chosen to assure chronological comparability for the vertical diffusion aspects of the study. It was this younger sibling member of the treatment family, the proposed recepient of vertical diffusion treatment effects, with which the study was primarily concerned. Table 2 gives the schematic representation of the groups involved in the study. The demographic characteristics collected at the beginning of the study on the treatment families are given in Table 1.

The specified formal areas of concern have been language maturity, intellectual functioning, concept formation, cognitive style, and variables--such as achievement press--in the home environment conducive to development. In addition we have collected data on such informal and unobtrusive indices of improved adequacy as the mother's ability to plan, to organize and to implement appropriate objectives in the home, the upgrading of her own level of aspiration as reflected in improved occupational status and her use of classroom learned methods and procedures in instructing her children at home. Such changes in life style may be more important markers of experimental effectiveness than the traditional psychometric measures.

The Instructional Programs

Because of the concern for a differential effect upon the younger siblings in the family, both the program for the mother and the program for the target child (not the younger sibling) will be described.

Table 2

Maximum Impact	*Mother *Target-aged Treatment Child Younger Sibling
Curriculum	Mother *Target-aged Treatment Child Younger Sibling
Home Visitor	*Mother *Target-aged Treatment Child (Home Visitor 1) **Younger Sibling (Home Visitor 2)
Front Wave I	
Front Wave II	
Younger Sibling Comparison Group	Mother Younger Sibling-aged Child

*Family members receiving treatment.
**Home Visitor 2 were younger siblings for the first year of the program, but became the child with whom the mother worked directly during the second year of the program.

Maximum Impact Group

Mothers' Program. Most of the mothers were employed as domestic or kitchen help at the beginning of the project. In order to insure that they would not be penalized for particiaption in the program, they were reimbursed $5.00 for their one-day-per-week participation. In addition, cooperative babysitting arrangements were made in the mothers' groups so that they could attend the training program at the Center. It has been observed that mothers from disadvantaged environments are sometimes criticized for lack of interest in their children when they fail to attend afternoon meetings of the local P. T. A. To attend the meetings, however, could mean the sacrifice of a day's wages from an already marginal income.

The major objective in the cognitive domain for the mother was to change her pattern of interaction with the child by providing skills and resources which she could call upon to stimulate her child intellectually. Such activities as learning how to read pictures to a youngster, to read storybooks, to play counting and singing games and to take advantage of those opportunities for intellectual enrichment ever present in the environment were actively stressed in the mother's curriculum. In the motivational domain, the major objective was to develop a better support system for the child, a system supportive of his inquisitiveness, his accomplishments, and his aspirations. Through observation and active classroom participation, the mothers were encouraged to use the positive reinforcement techniques demonstrated for them by teachers. They were encouraged in their observation to be aware of the child's progress and to support continued development actively. Indeed the curriculum was so designed that many self-help skills for the mother were included. Planned to develop her own motivations, they were carefully woven into the curriculum. Many opportunities to develop skills in food purchasing, budget management, home-making tasks, and personal care were included.

The major objective for the personal style variables was to improve the mother's self-concept through the development of skills and to provide a better approach to home management through planning. Thus, predictable mealtimes, more efficient use of her food dollar, and more attractive physical surroundings gave her a feeling of accomplishment and the approbation of her family members as a successful homemaker.

In the fourth domain, physical variables, the development of more nutritive meals is apparent from the foregoing. They were introduced to agencies such as the medical and dental clinic, where some of them made arrangements for their own medical and dental care.

During the first phase of the mother's program, the overarching goal was to develop planfulness as the key to development of self and family organization.

The physical facilities at the Early Training Center included space for observation through one-way glass around two sides of the classroom. Initially the mothers observed from this area under the guidance of the supervising teacher in charge of the mothers' program. She encouraged and reinforced any verbalization the mothers made concerning the ongoing activities in the classroom. As they began to be more comfortable in the setting, the superviser began to point out the more relevant aspects of the children's classroom program. Of particular concern were the control and management techniques, where positive reinforcement was emphasized for work well done and for the specific accomplishments of the children as they went about their classroom tasks. As the mothers became more attuned to the organization of the classroom for instruction and the purposes the activities were designed to accomplish, they were led in their observation to diagnose specific situations, to anticipate the outcomes, and to predict how the teacher would manage the problems she would meet.

At the same time, the mothers engaged in role-play activities to develop a repertoire of appropriate behavior to work in the classroom. Modeling upon the teacher's techniques and methods, they moved from reading stories to planning an activity lesson and carrying it out with their peers as their students. The observation and role-play served to complement each other and to provide a concrete situation in which they could practice their skills. As the program moved along and as individual mothers were judged to be ready for classroom participation, their initial experience was planned. Their first entry into the classroom was always at the snack period. This provided them the opportunity to interact with the children as they were engaged in a self-reinforcing activity where behavior control was not a problem. They were encouraged to talk with the children about what they were eating, where it came from, and how it grew.

As they became facile in their interaction with a group of children, they were then introduced into a large group activity where they had no responsibilities for instruction but assisted in organizing and participated with the children in circle games. This kind of activity gave them more experience with anticipating behavioral difficulties and using positive behavior management procedures.

Next they graduated to an activity where they had to provide the structure for the situation. Here they could be in charge of a housekeeping corner, a block play group, or the communications corner with telephones and recording devices. At this step it was necessary for them to plan the activity to some extent and to be resourceful in creating an inviting and stimulating situation for the children.

Finally, a formal lesson was their responsibility. At this level they prepared written lesson plans and carried them out. Following the lesson they evaluated as the regular classroom teachers did.

The overall objective of the second phase of the mothers' program was to provide a variety of contexts in which skills and abilities learned during the first phase could be generalized. The mothers continued their classroom participation on a regular basis, but small group meetings were held in individual homes on a rotating basis. This was supplemented by individual tutorials. Thus, the social responsibility of organizing and planning a meeting in one's home developed additional skills and provided the opportunity to implement and augment many of the instructional units on home management.

The more lengthy description of the mother's program may be summarized in order to review the key issues. (1) The activities were concrete and close to the day-to-day experience of the mother. They were designed to be intrinsically interesting and helpful. The average WAIS IQ of these mothers was approximately 85 at the beginning of the study, suggesting the level of operation that might be expected from them. (2) The program had specific objectives, which meant that the operations necessary to obtain those objectives could be clearly delineated. (3) The program was planned. Each step in the sequence was carefully designed to provide continuous movement and feedback to the subjects and allow accomodation of unanticipated contingencies. (4) The steps in the program were sequential and carefully monitored and guided. Careful program monitoring was important because one could be sensitive to individual differences within the group, providing the support necessary to build in intrinsic motivation for accomplishments. The steps in the program were of just manageable difficulty to insure success, often a new experience to women who had had a long history of failure. (5) The program was geared toward self-help, an important factor in providing the basis for developing competency and a feeling of self worth. (6) There was rapid feedback concerning performance. Since the program was so geared that success was almost inevitable, feedback most often was positive, indicating to the mother that she was a competent person.

Socialization for Competence--The Children's Program. The ecological observations which Maxine Schoggen of the Demonstration and Research Center for Early Education has been conducting in the homes of disadvantaged families confirms our assumptions concerning the inadequacy of the role the mother takes as an instrumental agent in the child's ecological system. Perhaps the observation of greatest impact has been the relative lack of structure or organization evident. Few attempts have been observed to impose order upon the physical and temporal environment of the kind with which we are all familiar. Certainly this is not confined to the homes of lower socioeconomic groups, but it is an observation that is relatively general among them. It may well be a crucial defining variable in the operational definition of disadvantage.

Following George Kelly's (1955) thesis that man is basically a scientist and predictor, it is suggested that structure, order, indeed redundancy, are necessary to developing predictive accuracy. When he can predict events, he can choose appropriate behavioral alternatives to cope with the events, thus exercising a minimal control over them. As predicting skills increases both in accuracy and over greater intervals of time, he is able to exercise even greater control, increasing his opportunity for innovative and creative solutions to the problem which confronts him. This is the essence of competency.

Evidence from a variety of sources in the psychological literature suggests that man strives to impose order and structure upon the environmental chaos in which he finds himself. More importantly, there is evidence to suggest that organizing and structuring skills are learned. As the child learns to impose order and structure upon his environment, he is able to process information much more economically and efficiently. Efficient informational processing is essential to predicting environmental events. We have assumed that this learning takes place relatively early and is particularly susceptible to retarded development given an inadequate instrumental agent.

Using an informational processing model, the skill development program was carefully constructed to consider all of the conceptual dimensions used by the major sense modalities in the ordering process. For instance color, shape, size, volume, time, numerical, positional, and whole-part-whole relationships representing relatively invariate conceptual areas were task analyzed according to the molar sensory processes needed to assimilate information. In this fashion the decoding skills for each of the major sense modalities were specified. Once these specifications were made, the abstracting skills necessary for appropriate responses could be generated. On an a priori basis, the developmental sequence of matching (simple discrimination), recognition (appropriate response to a verbal label or command), identification (appropriate response to introduction of the stimulus), to response of choice (appropriate initiatory activity) became an instructional strategy. Evidence subsequently collected empirically demonstrated such ordering to be correct (Gilmer, 1969).

This elaborate and detailed work, when accomplished, provided a sequential road map around which appropriate activities could be designed to develop the complex of skills we feel are necessary for the child to be competent and able to cope effectively with later school activities.

Careful introduction and ordering of new material and steps of just manageable difficulty helped in moving motivations from an extrinsic to an intrinsic locus. Such a strategy also insured success, which helped to develop task orientation in school-related activities. Since the curriculum was directed toward the development of skill and placing order upon one's environment, content--as such--took a secondary role. The basic conceptual skills were assumed to be relatively invariant while content changes over time. Much more important than changing content is the ability to recognize a set of three or five, to understand the positional concepts before, behind, or through

and to discriminate rough from smooth or hot from cold. Content then became a vehicle for the development of skills. A unit approach was adopted which moved from the child himself through the family, school, local community, to urban and farm life. The unit emphasis was upon social studies, language, and science. Thus, within the context of ever broadening content areas, the skill development program increased in scope and the child developed ever more finely tuned capabilities.

Equally important to the development of coping skills was the development of attitudes necessary for sustaining developed skills and continuing the developmental momentum. Positive attitudes relating to school-type activities, ability to delay reward, persistence, achievement motivation, and so forth, were a few of the major sustaining attitudes which were systematically programmed into the curriculum. By carefully sequencing activities and tasks to develop these motivations, the child gained greater control over himself and his environment.

Central to the aptitude and attitude development was the careful programming of reinforcement schedules to move the child from a concrete and extrinsic reward system to an abstract and intrinsic one. Careful contingency management was critical to the child's progress and his rapid development in the program.

The goal has been to develop a curriculum based upon substantive research and theory with clearly defined goals and objectives. In this way it is believed possible to delineate the step-by-step procedures for obtaining our objectives which can be communicated easily for application in other contexts and with other populations.

Curriculum Group

The children's program in the Curriculum group was as exact a replica as we could make of the program planned for the target-aged children in the

Maximum Impact group. No treatment was planned for the mothers, other than what might be seen as the most minimal contacts that were necessary for the ongoing program--such as notification in changes of the plans, special events, some attention to the children at Christmas and a final "graduation" exercise for the children when the preschool was completed.

Home Visitor Group

The treatment in the Home Visitor group was based upon the same general rationale as that in the Maximum Impact group. The activities planned and the interactions with the mothers were developed to be consistent with the general emphases and those of the Maximum Impact group.

Obviously, this was a far more diluted treatment, since only one hour was spent per week with each family, plus the necessary planning time, in contrast to the twenty hours with the target-aged child, and the four hours with the mother in the Maximum Impact group. Lessons for the home visitor's hour were planned to be highly concrete and specific to the situation of the mother and children in the home. "Assignments" were left for mother and target-aged child each week. These were activities planned in accordance with the general goals of the program and were ones which would take the active participation of the mother with the child to reach completion. In the beginning activities were specified for five days a week. A "fading" technique was used, however, so that after a period of time activities were planned for only four days, and the mother was to exercise her own initiative on the fifth day. Then an increasing independence and initiative of the mother in carrying out the general aims for the week was encouraged.

This is obviously a highly economical program as compared with the Maximum Impact group. The total cost is only about one-fifth that of the

cost for a mother-two child triad in the Maximum Impact group. It thus affords an interesting comparison from the standpoint of cost efficiency.

Front Wave Groups

Because of limitations and the number of available and appropriate triads in this housing project, it was not possible to constitute a group that could be reasonably considered as a controlled one, certainly not one randomized out of some of the initial pool of subjects. Instead it was necessary to constitute two meaningful comparison groups following the terminology of David Weikart (1967) we have used the terms Front Wave groups; to designate these, since the children in these groups were approximately one year in age older than the target-aged children in our Maximum Impact group and Curriculum group. Every effort was made to make these children and their parents as demographic and similar as possible to the children in the experimental groups.

The housing project from which all these children came has been originally selected as the one in which there were the least number of community programs or other kinds of activities from outside taking place. It was not feasible, however, to keep the comparison groups entirely uncontaminated. Indeed, it was not possible to avoid contamination in the experimental groups.

Chapter III

Results

This section of the present paper reports certain pretest data, and the results over time for the target-aged children and younger siblings on the Binet, results on the Peabody Picture Vocabulary test, and on a specially constructed concept test. During the course of the study a fair number of other measures have been used, most of them not for an extended period of time, as for one reason or another, they appeared to prove themselves unsuitable. The results in terms of school performance will be reported at a later date when data are analyzed for the first two years of school attendance of the target-aged children. The later report will also give results on some of the other findings of the study in terms of less formal measures, ones that we used for only a brief period of time.

Throughout this section of the report the .05 alpha level of significance is used, unless otherwise indicated. Probability levels are given, however, and accompanying mean scores reported for the general interest of the reader.

The psychometric data reported lend themselves to analysis of variance model. Analysis of variance designs have been used for the original analyses. For the subanalyses those statistics were used which appeared to be the most appropriate. Throughout the results section of this report the .05 level of significance is used, unless otherwise indicated.

Pretest Measures

The mothers in the treatment and comparison groups were administered the Wechsler Adult Intelligence Scale (WAIS) as a pretest measure. There were no significant differences either between the groups on the WAIS Full Scale, or on Verbal and Performance IQ scores. The mean scores are reported in Table 3.

Table 3

Pretest WAIS Mean IQ scores as Pretest Measures for the Comparison and Three Treatment Groups of Mothers

Groups	N	FSIQ	VIQ	PIQ
Maximum Impact Mothers	19	83.78	84.63	85.00
Curriculum Mothers	18	84.78	86.06	85.11
Home Visitor Mothers	19	80.68	82.68	80.52
Comparison Mothers	20	80.05	80.95	81.30
Total	76	82.33	83.59	82.98

A Binet grand mean was compiled from the no treatment, pretest scores of the original members of the six treatment and comparison groups of children. This mean is representative of 126 children from 121 different families from the housing project area. It includes children whose ages ranged from approximately three years and six months to five years and six months of age. The mean Binet IQ scores for each group with its original N is given in Table 4. An analysis of variance revealed no statistical differences between the groups.

The original (pretest) Peabody Picture Vocabulary Scores (in IQ units) are presented in Table 5.

Table 4

Mean Pretest Binet IQ scores of Original Subject Population Form Treatment and Comparison Groups

Groups	Original N	Mean Binet IQ
Maximum Impact Target Child	20	88.80
Curriculum Target Child	19	90.21
Home Visitor 1 Target Child	19	83.34
Front Wave I	22	87.27
Front Wave II	21	86.00
Younger Sibling Comparison Group	25	81.28
Total	N 126	Mean Total 86.14

Table 5

Mean Pretest PPVT IQ scores of Treatment and Comparison Groups

Groups	Original N	Mean PPVT IQ
Maximum Impact Target Child	19	69.21
Curriculum Target Child	19	68.58
Home Visitor 1	19	53.26
Front Wave I	21	60.90
Front Wave II	21	67.10
Younger Sibling Comparison Group	24	58.04
Total	123	Grand 62.84

The group differences again are not statistically significant, although certain differences, as between the Home Visitor 1 and the Maximum Impact groups are fairly large.

Results on the Stanford Binet Intelligence Test (Form L-M)

Table 6 is an outline of Binet comparisons that were possible in terms of the availability of measures, and the time of administration of these measures.

Table 6

Treatment and Comparison Groups Binet IQ Measures
Included in Data Analysis

Group	Pretest	Post 1 Yr. Treatment	Post 2 Yrs. Treatment	Post 1 Yr. No Treatment	Post 2 Yrs. No Treatment
Maximum Impact Target Child	X	X	X	X	0
Curriculum Target Child	X	X	X	X	0
Home Visitor 1 Target Child	X	X	0	X	X
Front Wave I	X	0	0	0	X
Front Wave II	X	0	0	X	0
Maximum Impact Younger Sibling	0	X	X	X	0
Curriculum Younger Sibling	0	X	X	X	0
Home Visitor 2	0	X	X	X	0
Younger Sibling Comparison Group	X	0	0	0	0

The analysis for the three target-aged groups (Maximum Impact, Curriculum, and Home Visitor 1) over three trials yielded a significant interaction (Table 7). The simple effects of trials in the repeated measures design were investigated with one-way analysis of variance (Appendix Tables 1-3). There were no pretest differences between groups. The Maximum Impact and Curriculum groups were equal in performance across the three trials, and were superior to the Home Visitor 1 group on trials 2 and 3 as indicated by the t-test for mean differences in Table 8. The mean Binet IQ scores for the three groups are included in Table 9.

Table 7

Analysis of Variance of Binet IQ Scores for Maximum Impact, Curriculum and Home Visitor 1 Groups on Pretest, Post 1 Year Treatment, and Post 1 Year No Treatment

Source	df	MS	F	p
Between Subjects	52	398.905		
Groups (B)	2	2134.375	6.478	.003
Error (b)	50	329.486		
Within Subjects	106	77.666		
Trials (A)	2	1590.459	36.728	.000
Trials by Groups (AxB)	4	180.333	4.164	.004
Error (w)	100	43.304		
Total	158	183.390		

Table 8

Independent t-Tests on Simple Effects of Trials

Trials			df	t	P
Trial 2					
Maximum Impact	>	Home Visitor 1	32	3.08	.004
Curriculum	>	Home Visitor 1	32	5.52	.000
Maximum Impact	=	Curriculum	36	-1.22	.226
Trial 3					
Maximum Impact	>	Home Visitor 1	32	2.86	.007
Curriculum	>	Home Visitor 1	32	3.30	.002
Maximum Impact	=	Curriculum	36	.24	.800

Table 9

Mean Binet IQ Scores for Maximum Impact, Curriculum, and Home Visitor 1 Groups Over Three Trials

Groups	N	Pretest	Post 1 Yr. Treatment	Post 1 Yr. No Treatment
Maximum Impact Target Child	19	89.89	101.21	97.00
Curriculum Target Child	19	90.21	106.10	95.89
Home Visitor 1	15	84.20	88.20	83.46

The within-groups across-trial differences were investigated. The Maximum Impact group was significantly higher on the second trial than the first. The drop on the third trial was not significant.

The Curriculum group had their highest mean score on the second trial, which was significantly higher than their pretest and posttest measures.

The Home Visitor 1 group showed significant differences only on their first to their second trial. The dependent t-test measures for all three groups are in Appendix Table 4.

The mean Binet IQ scores on the target-aged treatment and comparison groups analysis are reported in Table 10.

Table 10

Mean Binet IQ Scores for Target-aged
Treatment and Comparison Groups

Groups	N	Pretest	Post 1 Yr. No Treatment	Post 2 Yrs. No Treatment
Home Visitor 1	15	84.20	83.46	86.73
Front Wave I	13	90.62		86.00
Front Wave II	13	85.46	85.23	
Maximum Impact Target Child	19	89.89	97.00	
Curriculum Target Child	19	90.21	95.89	

The Home Visitor 1 group and the Front Wave I group had Binet tests after two years of no treatment. A repeated measures design on the pretest and posttest measures for the two groups resulted in no significant differences on either trial. A similar design was employed to compare the same Home Visitor 1 group with the Front Wave II group. Here, the pretest and post-one-year no treatment measures were analyzed. Again, there were no statistically significant differences on either trial.

The Maximum Impact and Curriculum classroom groups were compared to the Front Wave II group on pre and post-one-year treatment measures. Table 11 gives the analysis results. Although the interaction alpha level was only .10 the inspection of the mean scores prompted further analysis.

Table 11

Analysis of Variance of Binet IQ Scores for Maximum Impact and Curriculum Target-aged Groups and Front Wave II Comparison Group

Source	df	MS	F	p
Between Subjects	50	259.030		
Groups (B)	2	606.562	2.480	0.092
Error (b)	48	244.549		
Within Subjects	51	58.450		
Trials (A)	1	564.812	12.356	0.001
Trials by Groups (AxB)	2	111.031	2.428	0.097
Error (w)	48	45.710		
Total	101	157.747		

Independent t-test for mean differences on Trial 2 were computed. Both the preschool target-aged groups were equal and in turn superior to the Front Wave II group. The analysis is given in Appendix Table 5.

Concern over the length and type of treatment prompted a comparison of all groups having received some direct type of educational stimulation. The two preschool target-aged groups, Maximum Impact and Curriculum, and the two Home Visitor groups, (Home Visitor 1, one year treatment; Home Visitor 2, one year as younger siblings, one year as target child) and the Front Wave I and Front Wave II comparison groups were compared on their first and last Binet measures. The analysis which shows a trials by groups interaction is in Table 12. There were differences on the post-treatment measure only (Appendix Table 6).

Table 12

Analysis of Variance of Pre and Post Binet
IQ Measures For All Children
Receiving Direct Educational Treatment

Source	df	MS	F	p
Between Subjects	95	279.689		
Groups (B)	5	483.000	1.800	0.120
Error (b)	90	268.394		
Within Subjects	96	62.328		
Trials (A)	1	49.000	0.9488	0.666
Trials by Groups (AxB)	5	256.350	4.958	0.000
Error (w)	90	51.697		
Total	191	170.439		

Orthogonal comparisons were made to permit the comparison of types and length of treatment effects. There were five comparisons:

1. DARCEE program versus other educational programs;
2. DARCEE two years of treatment versus one year of treatment;
3. DARCEE two years of preschool versus two years of Home Visitor program;
4. The two DARCEE preschool groups against each other;
5. The two Front Wave groups (other preschool programs) against each other.

Table 13 has the results. The DARCEE educational program was superior to other programs; DARCEE two years was superior to DARCEE one year. There were no differences between DARCEE preschool two years and DARCEE Home Visitor 2 (for two years). The remaining two comparisons were not significant.

There were no differences in performance between the Maximum Impact and the Curriculum target-aged children over four measures of pretest, post one and two years treatment and post one year no treatment. The highest scores obtained for both groups were at the end of the first and second year treatment periods. The measures for the end of one year no treatment period showed a significant drop for the Curriculum target-aged group; this was not true for the Maximum Impact target-aged group. The same two preschool target-aged groups were significantly higher than the Home Visitor 1 target-aged group on all comparisons except the pretest measure.

Within Family Comparisons

Within families comparisons were made of the performance of the target-aged children and their younger siblings. The first Binet for the younger sibling groups was administered when they were approximately three and a half years of age. This administration was post-one-year vertical diffusion potential, as it was administered after their older siblings had been in the program a year. Table 14 shows the mean Binet IQ scores for each family

Table 13

Orthogonal Comparisons of Treatment and Comparison Groups on Posttest Measures

Groups and Comparison				df	MS	F*	P
H_1:	Maximum Impact, Curriculum, Home Visitor 1, Home Visitor 2	>	Front Wave I, Front Wave II	1	921.16	5.16	.05
H_2:	Maximum Impact, Curriculum, Home Visitor 2	>	Home Visitor 1	1	778.48	4.36	.05
H_3:	Maximum Impact, Curriculum	=	Home Visitor 2	1	552.60	3.10	NS
H_4:	Maximum Impact	=	Curriculum	1	11.60	< 1.00	NS
H_5:	Front Wave I	=	Front Wave II	1	3.84	< 1.00	NS
	Error (w)			90	178.43		

*F.95; 1/60 df = 4.00

member pair, the time of administration, and the differences in the older and younger sibling groups scores.

Table 14

Mean Binet IQ Scores for Within Family Comparisons for the Three Treatment Group Families of Target Children and Younger Siblings

Groups	N	Post 1 Yr. Treatment	Post 2 Yrs. Treatment	Post 1 Yr. No Treatment
Maximum Impact				
Target Child	19	101.21	98.58	97.00
Younger Siblings	19	92.47	91.68	87.42
difference		8.74	6.90	9.58
Curriculum Group				
Target Child	13	107.62	103.30	97.38
Younger Sibling	14	87.28	85.07	83.64
difference		20.34	18.23	13.74
Home Visitor 1	13	88.54		86.46
Home Visitor 2	13	99.38		90.76
difference		-10.84		-4.30

The first Binet measure on the younger sibling groups was obtained after a year of vertical diffusion potential. The youth of these children at the beginning of the program precluded an actual pretest measure. On the assumption that these younger siblings would have performed similarly to the groups having actual pretest measures, two additional comparisons were made.

Table 15 shows the within family comparisons using the pretest Binet mean for the target-aged child against the first Binet mean (post one year vertical diffusion potential) for the younger sibling. There were no differences

between the Maximum Impact and Curriculum groups and their respective younger sibling groups. The younger Home Visitor 2 group was superior to its older sibling group (Home Visitor 1).

Table 15

Mean Binet IQ Scores for Within Family Comparisons Using the Pretest Means for the Target-aged Child and the First Binet Score for the Younger Siblings

Group	Binet IQ	t	P
Maximum Impact			
Target Child	89.89		
Younger Sibling	92.47	0.56	.588
Curriculum			
Target Child	91.53		
Younger Sibling	87.28	1.14	.264
Home Visitor 1	84.30		
Home Visitor 2	99.38	3.56	.002

The within family comparisons were studied with repeated measures designs of analysis of variance. Appendix Table 7 gives the analysis for the Maximum Impact target-aged group and its younger sibling group. There were significant trials and groups main effects. The target-aged group was superior to its younger sibling group. The trials effects (Appendix Table 8) showed that Trials 1 and 2 were equal, and that both were superior to Trial 3.

The analysis for the Curriculum target-aged group and their younger sibling group analysis also showed significant trials and groups main effects (Appendix Table 9). Again, the target-aged group was superior to the younger sibling group. The performance on trials 1 and 2, and 2 and 3 were equal. Trial 1 was superior to Trial 3 (Appendix Table 10).

The performance of the Home Visitor 1 (target-aged older siblings) and Home Visitor 2 (one year as younger sibling, second year as treatment child) was compared on measures of post one year treatment, and post one year no treatment. There was only a significant trials main effect, with Trial 1 being greater than Trial 2 (Appendix Table 11).

A second comparison was made, using the younger sibling groups' scores as contrasted to the demographic mean of pretest scores, in the same fashion as in Table 15. Both the Maximum Impact younger sibling and the Home Visitor 2 groups were significantly higher than the hypothetical population mean. The Curriculum younger sibling group was not statistically different (Table 16) from this mean.

Table 16

Comparison of Mean Binet IQ Scores of the Three Younger Sibling Groups After 1 Year of Vertical Diffusion Potential With the Demographic Mean

Group	N	Mean IQ	S.D.	t	p	$t_{.95}$
Maximum Impact Younger Siblings	19	92.47	14.81	1.86	< .05	1.73
Curriculum Younger Siblings	14	87.28	10.60	.40	NS	1.77
Home Visitor (2) Younger Siblings	17	96.24	13.72	3.04	< .05	1.75

Younger Siblings and Younger Sibling Comparison Group

The mean age of the younger siblings in all groups was approximately 4 years, 6 months at their second Binet administration. A similarly constituted comparison group was tested at this time. The mean IQ scores are given in Table 17. The analysis of variance reported in Table 18 shows a significant between groups difference. The interest here was in the effects of the maternal participation on the performance of the younger siblings. Consequently, orthogonal comparisons were made between Maximum Impact younger siblings plus Home Visitor 2 (both groups having maternal participation) against Curriculum younger siblings and the no treatment comparison group. The difference was statistically significant in favor of the two groups whose mothers were involved in the program. There were no differences between these two groups nor between the other two groups (Table 19).

Table 17

Mean Binet IQ Scores for Younger Sibling Treatment Groups and Comparison Group

Group	Mean IQ
Maximum Impact Younger Siblings	91.68
Home Visitor 2	94.41
Curriculum Younger Siblings	85.07
Younger Sibling Comparison	81.24

Table 18

Analysis of Variance of Binet IQ Scores for Three Treatment Younger Sibling Groups and Their Comparison Groups

Source	df	MS	F	P
Between Groups	3	735.50	5.676	0.001
Within Groups error	71	129.57		
Total	74	154.14		

Table 19

Orthogonal Comparisons of Binet Scores for Maximum Impact Younger Sibling, Home Visitor$_2$, Curriculum Younger Sibling, and Younger Sibling Comparison Group

Source	df	MS	F	P
H_1: Maximum Impact + Home Visitor 2 > Curriculum + Comparison	1	2007.98	15.50	.05
H_2: Maximum Impact = Home Visitor 2	1	66.74	1.00	NS
H_3: Curriculum = Comparison	1	131.74	1.02	NS
Error (w)	71	129.57		

$F_{.95}$ 1/70 df = 3.98

Summary of Within Family Comparisons

In general, the performances of the two preschool target-aged treatment groups were superior to their younger sibling groups. The differences over time for the Maximum Impact target-aged group and their younger siblings, however, were much smaller than the differences for the Curriculum groups' within family comparisons (Table 14).

The Home Visitor 2 (younger siblings) were higher than the Home Visitor 1 (target-aged group) on the measures obtained at post one year treatment and post one year no treatment periods, though not significantly so.

Younger Sibling Basic Concept Test Data

At the same time that the younger sibling comparison group was tested, a test especially designed for the younger sibling groups was administered. The purpose of this special test was to investigate the vertitical diffusion effects as they were related to conceptual development. Consequently the test was based upon the actual curriculum content with which the target-aged child had been involved. In the Maximum Impact and Home Visitor groups, the mothers had received instruction in the same curriculum content areas.

The Basic Concept Test (Gilmer, 1969) was designed to measure the specific conceptual processes of matching, recognition, and identification, as applied to stimuli representative of shape, color, size, position, direction and number.

A comparison of performance of the three younger sibling groups and their comparison group was made. The analysis of variance of the groups' performance on the three subtests of Matching, Recognition, and Identification yielded a significant interaction (Table 20). The simple effects of subtests were investigated. There were differences on Matching, Recognition, and Identification. Figure 1 shows the groups' mean performances on the subtests.

Orthogonal comparisons were made to investigate the type of treatment effects on the specific subtests. Table 21 gives the results. The two groups having maternal involvement--Maximum Impact younger siblings and Home Visitor 2--were compared to the two groups having no maternal involvement--Curriculum younger siblings and younger sibling comparison groups. The two sub-groups in these comparisons were compared to each other. Maximum Impact younger siblings and Home Visitor 2 were superior to Curriculum younger siblings and the younger sibling comparison group on all three subtests. There were no other significant differences.

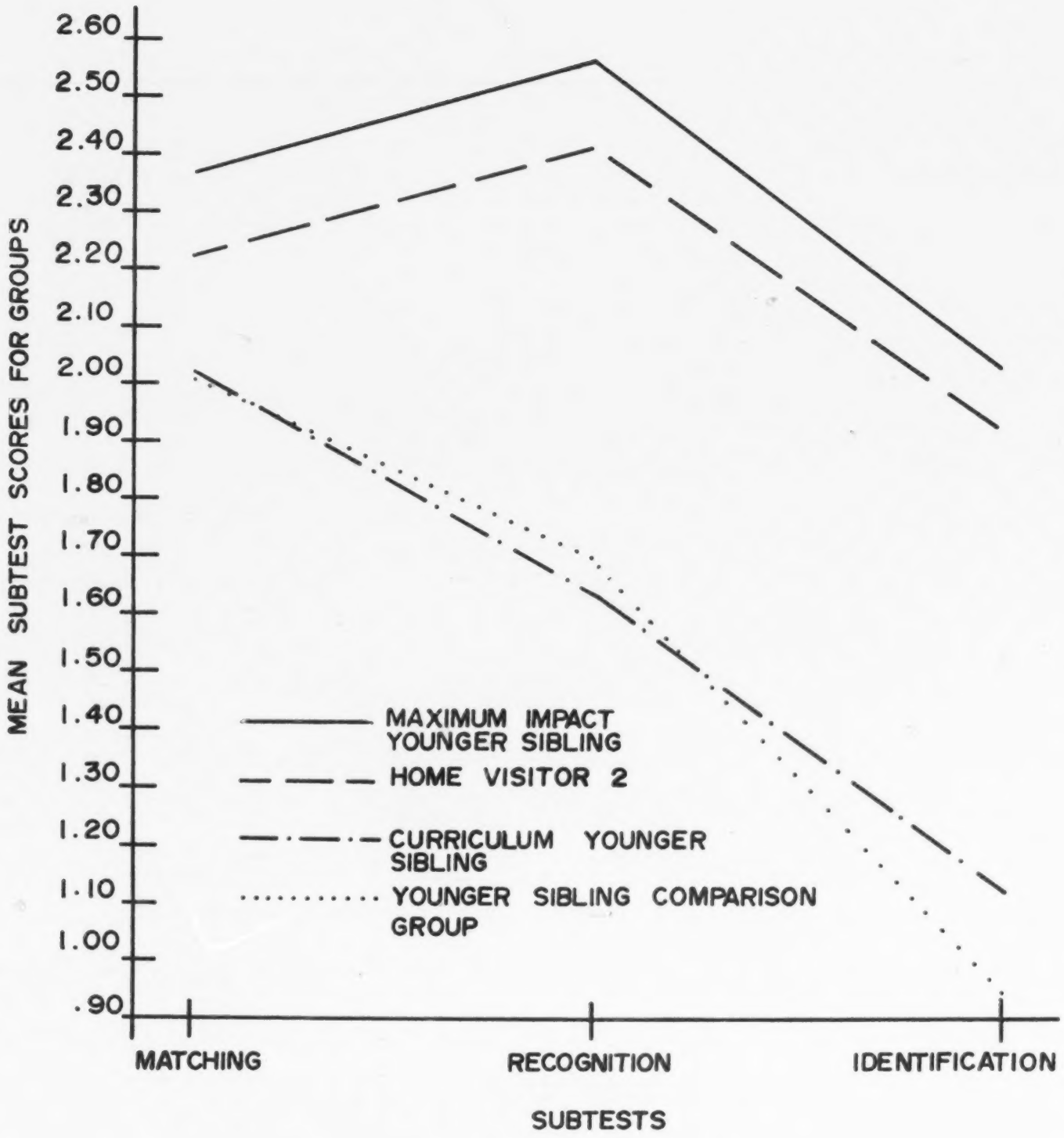

FIGURE 1 INTERACTION BETWEEN SUBTESTS AND PERFORMANCE OF GROUPS.

Table 20

Analysis of Variance: Performance of Groups on Basic Concept Test

Source	df	MS	F	P
Between Subjects	79	.75		
Groups (B)	3	9.43	23.00	.001
Error (b)	76	.41		
Within Subjects	160	.23		
Subtests (A)	2	10.58	149.01	.001
Subtests by Groups (AxB)	152	.071	12.39	.001
Error (w)	239	.040		

Data Analysis on the Peabody Picture Vocabulary Test

It was originally intended to use the Peabody Picture Vocabulary Test (PPVT) as a psychometric measure to accompany the Binet. As the intent of the program became more clearly directed toward the development of conceptual processes among the children, the PPVT was not continued as a measure.

Table 22 shows the availability and time of administration of PPVT measures. It will be remembered from Table 21 that there were no group differences among the initial scores of the nine groups.

Table 21

Orthogonal Comparisons Summary Table: Basic Concept Test Subtests

Source of variation	df	MS	F	P
Subtest Matching				
H_1: Maximum Impact + Home Visitor$_2$ = Curriculum + Comparison	1	1.57	16.18	<.001
H_2: Maximum Impact = Home Visitor$_2$	1	.006	< 1.00	
H_3: Curriculum = Comparison	1	.002	< 1.00	
Error (w)	76	.097		
Subtest Recognition				
H_1: Maximum Impact + Home Visitor$_2$ = Curriculum + Comparison	1	12.94	71.88	<.001
H_2: Maximum Impact = Home Visitor$_2$	1	.004	< 1.00	
H_3: Curriculum = Comparison	1	.05	< 1.00	
Error (w)	76	.18		
Subtest Identification				
H_1: Maximum Impact + Home Visitor$_2$ = Curriculum + Comparison	1	18.29	65.32	<.001
H_2: Maximum Impact = Home Visitor$_2$	1	.0001	< 1.00	
H_3: Curriculum = Comparison	1	.28	1.00	
Error (w)	76	.28		

Table 22

Treatment and Comparison Groups PPVT IQ
Available Measures Included in Analysis

Group	Pre	Post 1 Yr. Treatment	Post 2 Yrs. Treatment
Maximum Impact Target Child	X	X	X
Curriculum Target Child	X	X	X
Home Visitor 1	X	X	O
Front Wave I	X	O	O
Front Wave II		O	O
Maximum Impact Younger Siblings	O	X	X
Curriculum Younger Siblings	O	X	X
Home Visitor 2	O	X	X
Comparison Group Younger Siblings	X	O	O

The analysis of the PPVT data reported includes the performance of the older target-aged groups; the within family comparisons; and the younger sibling groups. Table 23 shows the mean PPVT scores of the groups included in the analysis.

The analysis for the Maximum Impact and Curriculum target-aged groups and Home Visitor 1 group on their pretest and post one year treatment measures yielded only a trials effect over time (Appendix Table 12).

Comparison of pretest, post one year, and post two years treatment for the Maximum Impact and Curriculum target-aged groups resulted in the same trials effect (Appendix Table 13).

The within family comparisons were made for the individual families. The mean PPVT IQ scores for the younger sibling groups are in Table 23. The Maximum Impact target-aged group was significantly higher than their younger sibling group on analysis of post 1 and 2 years treatment. The simple effects of trials were investigated with an Independent t-test (Appendix Table 14). The target-aged group improved over time.

The same format for comparisons was followed for the Curriculum group and their younger siblings. The analysis resulted only in a groups main effect, with the older, target-aged group being superior (Appendix Table 15). There were no significant differences between the Home Visitor 1 and Home Visitor 2 groups in testing their post 1 year treatment scores.

Table 23

Mean PPVT IQ Scores for Maximum Impact, Curriculum and Home Visitor 1 Target-aged Treatment Groups

Groups	Pretest	Post 1 Yr. Treatment	Post 2 Yrs. Treatment
Maximum Impact	69.21	80.84	92.84
Curriculum	68.58	81.84	93.58
Home Visitor 1	55.86	76.40	

Table 23 (cont.)

Mean PPVT IQ Scores for the Three
Treatment Groups' Younger Siblings

Groups	Post 1 Yr. Treatment	Post 2 Yrs. Treatment
Maximum Impact Younger Siblings	67.84	62.42
Curriculum Younger Siblings	60.71	62.50
Home Visitor 2 Younger Siblings	70.46	65.70

Table 24 gives the results of the analysis of variance comparing the three younger siblings groups and their comparison group. The mean PPVT IQ of the younger sibling comparison group was 58.04. There were no significant differences between the groups.

Table 24

Analysis of Variance of PPVT IQ Measures for the Three Younger
Siblings Groups and Their Comparison Group

Source	df	MS	F	P
Between Groups	3	204.14	0.438	0.730
Within Groups	70	465.06		
Total	73	454.34		

The somewhat incomplete data on the PPVT lead to two conclusions: the amount and intensity of an educational program seems to be related to changes in PPVT scores; the combination of educational program and increasing chronological age and non-treatment related experiences yields a modest but consistent gain in scores.

Chapter IV

Discussion of Results

The general purpose of this study was to develop and assess systematically, and to compare, three models for improving the educability of young children from low-income homes. To fulfill this purpose a field research design was needed which would have longitudinal characteristics. Sample selection was a first priority, as it was necessary to maximize demographic comparibility and at the same time to minimize attrition. Thus the setting selected for the study was a low-income and publicly administered housing authority project. The population appeared to be a homogeneous inter-city grouping with more stability than the typical somewhat transient and mobile group; the stability was desirable for gathering follow-up information.

Through the two and one-half years of this study, measurement was a major concern. This problem existed across all groups and within specific treatments as well. A number of standardized instruments were used, as well as variations and modifications of available instruments, plus especially designed measurement devices. Most of the information gathered for criterion purposes did not appear to have the reliability needed for a longitudinal study. The consequent reliance upon the Stanford-Binet in this report to reflect program effect arises from this situation. An additional limitation of this report is that it does not address itself to the sustaining of actual academic performance of the children as they go through school. The follow-up aspects of this study will be reported in a second paper. Within these limits, it was possible to study the potential of vertical diffusion and the differential effect of the involvement of the mother in the treatment through the various groups.

It is evident from the initial WAIS scores of the mothers that different intellectual ability was not a factor in the children's treatment groups. There were no differences among the four groups of mothers.

The intensive early educational program for the Maximum Impact and Curriculum target-child groups was planned and monitored in order to maintain as exact a replication as possible. Consequently, the performance of these two groups of children was never different, and the increased and sustained gains of both groups on intellectual measures up to school entrance is not surprising. Again, the question of a long maintenance of early gains remains in the realm of follow-up. The significant drop of the Curriculum target-child on the Binet for the two years beyond experimental treatment may be an artifact. Again it may reflect the lack of maternal involvement in this group, since the Maximum Impact group did not drop significantly during this period.

The performance of the Home Visitor 1 group appeared to reflect a simple finding of too little, too late. Again the performance of these children, who were a year older and only a year away from school, and who had a much less intensive program, is only to be expected. The merit of the home visiting program is more apparent in the Home Visitor 2 group, where the children were a year younger, and had two years of home teaching stimulation. The Home Visitor 2 group did not reach the scores of the two intensive classroom groups (Maximum Impact and Curriculum) but there were no statistical differences in orthogonal comparisons with the two. Considering the cost effectiveness of a two-year home visitor program, compared to the operational expenses of operating an early education center for 30 months, the merit of the home visiting method is undeniable. Presumably, over a period of two years, the mother becomes an increasingly effective teacher for her child.

The performance of the Maximum Impact and Curriculum preschool groups exceeds the performance of the two Front Wave groups, as would be expected. The similarity of the Home Visitor 1 group with the two Front Wave groups over time sheds some light upon the economics of the issue. Both of the Front Wave groups were enrolled in year-round rather traditional preschool programs. These appear to have been no more effective than the weekly one-hour individual teaching session involving the mother.

The two younger sibling groups, Maximum Impact and Home Visitor 2, both with maternal involvement, exceeded the performance of the Curriculum younger sibling group (who had only an older sibling in a treatment but not the mother). The Curriculum younger siblings were comparable to the no treatment younger siblings. It still remains to be seen as to how the performance of these children on their earlier Binet measures will be reflected in school achievement.

On the Basic Concept Test the two groups of younger siblings who had direct maternal participation in the program performed consistently higher than the other groups. The mean scores of these two groups was significantly higher on all three sub-tests.

Not reported in the results section is a careful study that was made of the changes in life style of the mothers in the treatment groups. Since this data gathering depended largely on an extended and relatively close contact with the families, it was not possible to collect similar data on the Curriculum and the Comparison groups. To the extent that one may attribute the life style changes to the involvement of the mothers in the program, we have here some of the most interesting results of the study. These findings, however, should certainly be interpreted with caution because, over a period of two and one half years in the late 1960's, many social changes were taking place.

Still we find that many of the mothers went on to finish their high school education and enrolled in training courses to upgrade vocational skills. Several have taken positions in preschool and day care centers. Five of the mothers at one time were functioning as home visiting teachers themselves.

Interest and participation in community affairs broadened. Social contacts with other members of the community increased markedly. There were cooperative outings, a rotating book library, and the establishment of a bowling league which included fathers. One somewhat ironic effect of the program, from the standpoint of maintaining statistical control, was the wish of many of the parents to move out of the housing project to more improved housing. There were increases in the number of checking and savings accounts, which almost none of the parents had before the study began.

These changes in life style would seem to be the result of the development of environmental mastery, which may be expected to have a supporting effect on the children's continued development. Only our future data gathering, however, will show us whether this prediction is correct.

A Final Word

The study of the sort reported in this paper tends to be somewhat diffuse and to raise more issues than it answers.

Certain things do seem to be fairly well documented, however, ones which may be of interest from the standpoint of cost effectiveness. The cost is always an important issue in any program that one might wish to consider for widespread field adoption.

One of the aspects of cost effectiveness is the loss of experimental effect over time. Although the typical finding is that early intervention with young

low-income children tends to wash out over time, there are a few studies, including that of one of the authors (1970) which would suggest a sustaining over as much as three or four years post treatment. In the current study there is already some evidence that may point to the sustaining effect of involving the mothers, as was done in the Maximum Impact and the Home Visitor groups.

Also suggested is the issue of the importance of timing. The home visiting program seems to have had relatively little effect on the older child in the family. A home visitor program which involves only one visit per week appears to be simply not enough to upgrade the educability of a child who is between four and one-half to five and one-half at the beginning of the intervention. On the other hand, however, this treatment appeared to be effective with the children from one to three years younger.

Whether to involve mothers in a preschool program, where the children meet regularly in a classroom, would seem to be a question of how much a person is interested in sustaining effects. Our answer is that the involvement of the mothers seems to have little effect on the immediate performance of the child but it appears, we may say somewhat tentatively, that this involvement may have a sustaining effect over time.

Most striking of all from the standpoint of cost effectiveness are the intra-family effects. The younger siblings in the home visitor group did about as well as the younger siblings in the Maximum Impact group, although their program probably cost only from one-fourth to one-fifth as much as the program for Maximum Impact group. Home visiting, as we have practiced it, would appear also to be an effective way to make changes in family groups, conspicuously the younger siblings and the mothers.

An auxiliary finding from the standpoint of cost effectiveness would appear to be the improvements in life style, including the greater economic viability of the family units after intervention. To make a marked improvement and to sustain it over time, we suspect that the combination of an intensive preschool program for the child and an enabling program for the parents may be the program with most to recommend it. In a location, however, where this is not geographically or economically feasible, one may well consider a home visiting program directed toward young children and their mothers. For such a program can be a feasible and economical way to bring about the enhanced educability of the children in a family and the greater personal effectiveness of the parent.

References

Gilmer, B. R. Intra-family diffusion of selected cognitive skills as a function of educational stimulation. DARCEE Papers and Reports, 1969, 3, No. 1.

Gray, S. W. & Klaus, R. A. The early training project: A seventh year report. Nashville, Tennessee: Demonstration and Research Center for Early Education, George Peabody College, 1969.

Kelly, G. A. The Psychology of Personal Constructs. New York: W. W. Norton & Company, 1955, Vol. 1.

Klaus, R. A. & Gray, S. W. The early training project: A report after five years. Monographs of the Society for Research in Child Development, 1968, 33 (4, Serial No. 120).

Weikart, D. P. (Ed.) Preschool intervention: A preliminary report of the Perry Preschool Project. Ann Arbor, Michigan: Campus Publishers, 1967.

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Table 1

Analysis of Variance of Simple Effects of Trial 1 for Treatment Target-aged Groups Trial 1

Source	df	MS	F	P
Between Groups	2	184.656	1.568	0.216
Within Groups error	50	117.708		
Total	52	120.283		

Table 2

Analysis of Variance of Simple Effects of Trial 2 for Treatment Target-aged Groups Trial 2

Source	df	MS	F	P
Between Groups	2	1398.656	10.568	.000
Within Groups error	50	132.350		
Total	52	181.054		

Table 3

Analysis of Variance of Simple Effects of Trial 3 for Treatment Target-aged Groups Trial 3

Source	df	MS	F	P
Between Groups	2	911.875	5.492	.007
Within Groups error	50	166.031		
Total	52	194.717		

Table 4

Dependent t-Test Results Within Groups Across Three Trials
(Pre, Post 1 Year Treatment, and Post 1 Year No Treatment)

Group	Trials	df	t	P
Maximum Impact	1 < 2	18	5.32	.000
	1 < 3	18	3.02	.007
	2 = 3	18	1.52	.144
Curriculum	1 < 2	18	8.78	.000
	1 < 3	18	2.36	.028
	2 > 3	18	4.20	.000
Home Visitor 1	1 < 2	14	2.48	.025
	1 = 3	14	0.46	.650
	2 > 3	14	2.54	.022

Table 5

Independent t-Tests for Simple Effects of Trial Two, Post 1 Year
No Treatment for Maximum Impact and Curriculum Target-Aged
Groups and Front Wave II

Trial			df	t	P
Maximum Impact	>	Front Wave I	30	2.44	.020
Curriculum	>	Front Wave I	30	2.89	.007
Maximum Impact	=	Curriculum	36	.24	.800

Table 6

Analysis of Variance for Simple Effects of Trials on Postest Measure for All Groups Receiving Direct Educational Treatment

Source	df	MS	F	P
Between Groups	5	453.525	2.542	0.033
Within Groups error	90	178.430		
Total	95	192.909		

Table 7

Analysis of Variance of Binet IQ Scores for Maximum Impact Target-aged and Younger Sibling Groups on Post 1 and 2 Years Treatment and Post 1 Year no Treatment

Source	df	MS	F	P
Between Subjects	37	546.305		
Groups (B)	1	2012.625	3.980	0.050
Error (b)	36	505.574		
Within Subjects	76	53.201		
Trials (A)	2	208.443	4.180	0.018
Trials by Groups (AxB)	2	17.806	0.357	0.706
Error (w)	72	49.872		
Total	113	214.660		

Table 8

Dependent t-Test on Trials Main Effect for Maximum Impact Older and Younger Sibling Groups

Trials	t	P
Trial 1 = Trial 2	1.055	0.298
Trial 1 > Trial 3	2.668	0.010
Trial 2 > Trial 3	2.016	0.048

Table 9

Analysis of Variance: Comparison of Performance on Binet IQ Measures for Curriculum Target Child and Younger Sibling Groups Over Three Trials: Post 1 Year and 2 Years, Treatment, and Post 1 Year no Treatment

Source	df	MS	F	P
Between Subjects	26	507.620		
Groups (B)	1	6147.750	21.799	0.000
Error (b)	25	282.015		
Within Subjects	54	65.777		
Trials (A)	2	313.802	5.660	0.006
Trials by Groups (AxB)	2	76.322	1.376	0.260
Error (w)	50	55.435		
Total	80	209.376		

Table 10

Dependent t-Test on Trials Main Effect for Curriculum
Older and Younger Sibling Groups

Trials	df	t	P
Trial 1 = Trial 2	26	1.602	0.118
Trial 1 > Trial 3	26	3.046	0.005
Trial 2 = Trial 3	26	1.933	0.061

Table 11

Analysis of Variance: Comparison of Performance on Binet IQ
Measures for Home Visitor 1 and Home Visitor 2 Over Two Trials:
Post 1 Year Treatment and Post 1 Year No Treatment

Source	df	MS	F	P
Between Subjects	25	299.810		
Groups (B)	1	746.375	2.654	0.112
Error (b)	24	281.203		
Within Subjects	26	76.519		
Trials (A)	1	371.595	6.030	0.020
Trials by Groups (AxB)	1	138.904	2.254	0.142
Error (w)	24	61.625		
Total	51	185.975		

Table 12

Analysis of Variance of PPVT IQ scores for Maximum Impact, Curriculum and Home Visitor 1 Target-aged Groups on Pre and Post 1 Year Treatment Measures

Source	df	MS	F	P
Between Subjects	52	627.471		
Groups (B)	2	868.562	1.406	0.254
Error (b)	50	617.827		
Within Subjects	53	240.179		
Trials (A)	1	5754.434	43.522	0.000
Trials by Groups (AxB)	2	182.033	1.376	0.260
Error (w)	50	132.220		
Total	105	431.980		

Table 13

Analysis of Variance of PPVT IQ Pre and Post 1 Year and Post 2 Years Treatment Measures for the Maximum Impact and Curriculum Target-aged Groups

Source	df	MS	F	P
Between Subjects	37	497.422		
Groups (B)	1	3.875	.008	0.928
Error (b)	36	511.131		
Within Subjects	76	244.947		
Trials (A)	2	5618.076	54.918	0.000
Trials by Groups (AxB)	2	7.174	0.070	0.932
Error (w)	72	102.298		
Total	113	327.616		

Table 14

Analysis of Variance of PPVT IQ Measures on Post 1 and 2 Years Treatment Effects for the Maximum Impact Target and Younger Sibling Groups

Source	df	MS	F	P
Between Subjects	37	797.716		
Groups (B)	1	8955.564	15.680	0.000
Error (b)	36	571.109		
Within Subjects	38	204.986		
Trials (A)	1	205.578	1.204	0.279
Trials by Groups (AxB)	1	1441.546	8.448	0.006
Error (w)	36	170.621		
Total	75	497.400		

Table 15

Analysis of Variance of PPVT IQ Measures on Post 1 and 2 Years Treatment Effects for the Curriculum Target and Younger Sibling Groups

Source	df	MS	F	P
Between Subjects	26	536.875		
Groups (B)	1	9778.064	58.472	0.000
Error (b)	25	167.227		
Within Subjects	27	290.388		
Trials (A)	1	567.175	2.039	0.162
Trials by Groups (AxB)	1	320.511	1.152	0.293
Error (w)	25	278.112		
Total	53	411.306		